

### **IN THE CLAIMS**

1. (Currently Amended) A piston pumping system comprising a piston guided within a guide tube and capable of performing a stroke movement along its longitudinal axis, opening into a pumping chamber, the pumping chamber being connected via a liquid-conveying connection with valve to a storage vessel and from the pumping chamber a liquid conveying connection leads to a device for delivering the liquid, wherein the guide tube is formed an O-ring seal held by a groove which seals off the piston, has a gas permeation coefficient of  $100 \text{ to } 500 \text{ N} \cdot \text{cm}^3 \cdot \text{mm} / (\text{m}^2 \cdot \text{h} \cdot \text{bar})$  for nitrogen ( $\text{N}_2$ ) and a radial compression of less than 30% and the seal fills the groove with a groove filling level of more than 90%.
2. (Original) A piston pumping system according to claim 1, wherein the groove filling level is more than 95%.
3. (Original) A piston pumping system according to claim 1, wherein the valve is a non-return valve.
4. (Original) A piston pumping system according to claim 1, wherein a non-return valve is formed in the connection to a device for delivering the liquid.
5. (Original) A piston pumping system according to claim 1, wherein the piston has a cross section of 0.25 to 4 mm.
6. (Original) A piston pumping system according to claim 1, wherein the piston has a length of 5 mm to 10 cm.

7. (Original) A piston pumping system according to claim 1, wherein the stroke movement of the piston along its longitudinal axis covers a length from up to 1 mm to 5 cm.
8. (Original) A piston pumping system according to claim 1, wherein the O-ring seal consists of silicon.
9. (Original) A piston pumping system according to claim 1, wherein the piston is a hollow piston in which the liquid-conveying connection with a valve which connects the pumping chamber to a storage vessel is integrated.
10. (Original ) A piston pumping system according to claim 1, wherein the movement of the piston is mechanically controlled.
11. (Currently Amended) A piston pumping system according to claim 10, wherein the piston is moved by ~~means of~~ a helical spring.
12. (Original) A piston pumping system according to claim 1, wherein the movement of the piston is electronically controlled.
13. (Currently Amended) A piston pumping system according to claim 12, wherein the piston is controlled by ~~means of~~ a microchip.
14. (Currently Amended) A piston pumping system according to claim 12, wherein the piston is moved by ~~means of~~ a piezoelectric element.
15. (Original) A piston pumping system according to claim 1, wherein the pump volume is from 1 microlitre to 1 ml.

16. (Original) A piston pumping system according to claim 1, wherein the device for delivering the liquid is at least one nozzle, at least one micro-pin or at least one microcutter along which the liquid is guided, at least canulas and/or at least one outlet.

17. (Original) A piston pumping system according to claim 1, wherein the cord thickness of the O-ring is from 0.3 to 3 mm.

18. (Withdrawn) A medical device for delivering pharmaceutical liquids comprising a piston pumping system comprising a piston guided within a guide tube and capable of performing a stroke movement along its longitudinal axis, opening into a pumping chamber, the pumping chamber being connected via a liquid-conveying connection with valve to a storage vessel and from the pumping chamber a liquid conveying connection leads to a device for delivering the liquid, wherein the guide tube is formed an O-ring seal held by a groove which seals off the piston, has a gas permeation coefficient of 100 to 500  $\text{N}\cdot\text{cm}^3\cdot\text{mm}/(\text{m}^2\cdot\text{h}\cdot\text{bar})$  for nitrogen ( $\text{N}_2$ ) and a radial compression of less than 30% and the seal fills the groove with a groove filling level of more than 90%..

19. (Withdrawn) A medical device according to claim 18, wherein the medical device is a transdermal therapeutic system which comprises in addition to the piston pumping system a storage vessel consisting of at least one moveable element or having a venting opening and at least one micro-pin or microcutter.

20. (Withdrawn) A medical device according to claim 18, wherein the medical device is an atomiser for liquids, a nasal spray, an eye spray or an inhaler